



NORWOOD PEDESTRIAN PLAN

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Facility Standards and Guidelines

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4. **Crosswalks**
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II. Additional Accessibility Information

III. Information Sources

Specific locations for facility installation and site improvements are provided in the **Project Identification and Priority List**. Any recommended improvements proposed to be located in the North Carolina Department of Transportation (NCDOT) right-of-way are under the jurisdiction of NCDOT Division 12. Contact the Division 12 Engineer before considering implementation of any improvements in the NCDOT right-of-way: Mike Holder, Division 12 Engineer, P.O. Box 47, 1710 E. Marion Street, Shelby, NC 28151, email: mholder@dot.state.nc.us.

All facilities shall adhere to the current U.S. Access Board definition of the American's with Disabilities Act (ADA). See: <http://www.access-board.gov/>

For additional facility information, refer to the NCDOT Office of Bicycle & Pedestrian Transportation's *Planning and Designing Local Pedestrian Facilities*, available by request: Email: bikeped_transportation@dot.state.nc.us

1. SIDEWALKS

Public sidewalks are intended to provide pedestrians a clear and convenient path of travel within the public right-of-way, separated from roadway vehicles, in a manner that is safe and accessible to all members of the public. They also provide places for children to walk, run, skate, ride bikes, and play. Sidewalks should feature a continuous travel path, clear of poles, signposts, and other obstacles that could block the obstruct pedestrians, obscure a driver's or pedestrian's view, or become a tripping hazard.

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Width of travel path

The Plan recommends a minimum travel path width of 5 ft. for a sidewalk or walkway, in accordance with the Federal Highway Administration (FHWA) and the Institute of Transportation Engineers (ITE). This width allows two people to pass comfortably or to walk side-by-side. This minimum width of the travel path must be free of obstructions, such as utility poles, or pedestrian amenities such as street furniture, trashcans, etc. and shall meet all requirements of the ADA standards for "accessible pathway".

Where sidewalks abut public or commercial buildings, or anywhere high concentrations of pedestrians are expected, a minimum travel path of 8 ft. should be allowed for.

Where sidewalks align with the edge of an angled or 90-degree parking lot, a minimum of 30 inches of parked car overhang obstructing the sidewalk shall be taken into account in order to maintain the minimum travel path width.

Connectivity

The alignment of new sidewalks shall be designed and constructed to serve pedestrians in the most direct and convenient manner possible without causing undue physical or aesthetic damage to existing trees or other site features. The design of new sidewalks shall also respect all required or proposed landscaping and other site features.

All new commercial and industrial development shall feature an on-site sidewalk system that connects the main entrance or the most convenient accessible entrance of the primary building to existing public sidewalks or public trails that are adjacent to or abutting the property. Sidewalk/driveway crossings shall be minimized in on-site sidewalk systems.

Paving type

For typical concrete sidewalk paving and construction method, refer to Town Standard Specifications and Construction Details for method of standard sidewalk paving and construction method.

Alternative paving should be considered for the following applications:

- A change in paving type can help distinguish the pedestrian buffer zone from the pedestrian travel path. Sand-set pavers are recommended in the buffer zone for ease of utility maintenance.
- Paving type should vary as a pedestrian path crosses a vehicular path in order to visually cue pedestrians (and drivers) and provide a tactile warning to the visually impaired.
- Textured pavements can be used to add significant aesthetic value and help define a unique place.

2. PEDESTRIAN BUFFER ZONES

Buffer zones between pedestrian paths and vehicular traffic provide a sense of security to those on foot or in wheelchairs and give the path a comfortable scale and clear definition. Buffers can also provide other benefits to pedestrians depending on the type used.

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- **Planting Strips** – Continuous zones of landscape, located between the sidewalk and the street curb or the edge of road pavement, perform a multitude of essential tasks. In addition to the safety buffer referred to above, planting strips contribute to the walkability of a street by providing shade. This element alone can often clinch the decision for a potential pedestrian on whether a route is “walkable” or not, particularly in the hot summer months. In addition to providing shade, street trees - along with turf and other plantings - help reduce urban temperatures, improve water quality, lower stormwater management costs, and add beauty to the street for the pedestrian, the driver, and the adjacent land use. The recommended planting width to permit healthy tree growth is 6 to 8 feet measured from the back of curb. Planting strips are the preferred means of providing a buffer, but are not feasible or appropriate in all pedestrian situations. Areas of high foot traffic may preclude landscaping due to maintenance considerations.
- **Paved buffer zones** - In some situations, continuous planting strips are not feasible, particularly where there is a high degree of foot traffic between the sidewalk and the street. Grass and other plantings would simply be trampled. In these cases, a buffer zone of some other kind should be provided between the travel path of the sidewalk and the curb. Though a constant width is preferred for this buffer zone, the width may vary as long as the buffer does not interrupt the pedestrian travel path. Items located in the buffer zone can include street furniture, planters, trees planted with tree grates, streetlights, street signs, fire hydrants, etc. Such items are placed in the buffer zones so as not to restrict pedestrian flow in the travel path. An additional buffer zone may also exist along the opposite side of the travel path, adjacent to buildings, open space, or off-street parking.
- **On-street parking** – As with other buffers, pedestrians feel safer with a physical barrier of a row of cars between them and moving vehicular traffic. Read further for more information about on-street parking strategies.



Though the buffers described above each provide some sort of physical barrier from moving vehicular traffic, it is vital for pedestrians on the sidewalk to have a clear view of drivers and vice-versa. This is a particularly important consideration in designing and maintaining planting strips.

3. STREET TREES

This Plan strongly recommends enhancing the Town of Norwood Tree Ordinance to give more complete direction for tree installation and maintenance. For more information about

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tree planting standards and other related policy and programs, see:

<http://www.seql.org/actionplan.cfm?PlanID=10>

Planting and Maintenance requirements

All street trees should be selected according to the standards described in the *American Standard for Nursery Stock* of the American Nursery and Landscape Association.

See: <http://www.anla.org/applications/Documents/Docs/ANLAStandard2004.pdf>

Install and maintain trees according to the International Society of Arboriculture (ISA) guidelines. See: <http://www.treesaregood.com/treecare/treecareinfo.aspx> or contact: ISA, P.O. Box 3129, Champaign, IL 61826-3129, USA. E-mail: isa@isa-arbor.com

Visibility

Street trees should never be allowed to obscure the line of sight between pedestrians and drivers. A clear view should be maintained between 30" and 72" above street. This area must be free of limbs and foliage for safe cross visibility. Other plantings should also follow this rule within 50 ft. proximity of street corners and other designated crossing points.

Tree characteristics

FORM - In order to maintain visibility, provide shade, and a comfortable pedestrian corridor, street trees should primarily be vase shaped, columnar, or oval in form (habit) with large spreading crowns.

LEAF - Street trees should primarily be deciduous, losing their leaves in the winter season.

ROOTS - Avoid trees with aggressively invasive roots adjacent to pavement or buildings.

SIZE - Large trees (growing over 35 ft. in height at maturity) are preferred as street trees except near overhead utility lines. Small tree (growing less than 35 feet in height at maturity) should be used in areas directly adjacent to or under utility lines.

SPACING – typically, large trees should be spaced approximately 40 – 50 feet when planted in a line, and small trees spaced at approximately 30 ft.

Species not recommended – Due to inherent problems with weak branches, aggressive roots, invasive spreading, or vulnerability to vehicular fumes, the following species are not recommended for street tree use:

- ❖ Bradford Pear / *Pyrus calleryana* 'Bradford' Pine
- ❖ Eastern White Pine / *Pinus strobus*
- ❖ Silver Maple / *Acer saccharinum*
- ❖ Norway Maple / *Acer platanoides*
- ❖ Sweetgum / *Liquidambar styraciflua*
- ❖ Tree-of-Heaven / *Ailanthus altissima*

Tree Pits and Tree Grates

Street trees should generally be located in open planting strips, however tree pits with tree grates may be a practical (though expensive) alternative in very high pedestrian traffic areas.

Tree pits should be constructed so that a continuous channel of soil under the pavement connects the individual pits and allows greater volumes of soil for root growth and water storage. Raised tree planting areas should likewise be designed to accommodate multiple rather than single trees.

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Tree grates should generally not encroach upon the travel path. However, for optimal pedestrian safety and comfort, all tree grates used should meet the ADA standards for "accessible pathway". Gratings should have openings not greater than 1/2" wide with slots perpendicular to the general direction of travel and have a coefficient of friction at least 0.6 on flat surfaces and 0.8 on ramps.

4. CROSSWALKS

Marked crosswalks indicate preferred locations for pedestrians to cross streets. They provide paths of increased safety to pedestrians as they warn motorists to yield to pedestrians in this designated right-of-way. Crosswalks should be placed strategically at high pedestrian volume locations, such as signalized intersections and high volume mid-block locations. Their placement should always be supported by other measures that help reduce speeds and warn drivers to be prepared to stop.

The effectiveness of crosswalks can be greatly enhanced by curb extensions. They shorten the crossing distance for pedestrians and improve their visibility of the crosswalk to oncoming vehicular traffic. They also serve as traffic calming devices whether pedestrians are crossing or not. See: **Traffic Calming Devices**.

For crosswalk markings, dimensions and other standards, refer to the Manual on Uniform Traffic Control Devices (MUTCD).

5. STRIPING, SIGNAGE & SIGNALIZATION

- All pedestrian and vehicular pavement striping, signage and signals, and the locations thereof shall conform to the MUTCD.
- Though traffic signage can carry legal authority, it should not be relied upon as the primary or sole means of influencing driver or pedestrian behavior. However, it is essential to anticipate the need for traffic signs in every situation to provide clear direction for both pedestrians and drivers. It is also important to avoid unnecessary signs as they may cause physical or visual obstruction, will require maintenance, can confuse and erode the significance of necessary signage and add to visual blight. Signs should only be installed when they fulfill a need based on an engineering study or engineering judgment.
- Traffic signals are intended to assign the right-of-way for vehicular and pedestrian traffic. Most traffic signals are installed based on vehicular traffic considerations, but some high-volume pedestrian circumstances warrant traffic signals themselves. According to the MUTCD, a traffic signal may be warranted when the pedestrian volume crossing a major street or mid-block location during an average day reaches 100 or more for each of any 4 hours; or 190 or more during any 1 hour. However, simply meeting one of the MUTCD warrants for signalization does not necessarily justify installation of a traffic signal. Even where warranted, traffic signals can cause

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excessive delay for drivers and pedestrians alike, and can increase certain accident types.

- All signalization should feature controlled timing operable by pedestrians and ADA compliant.

6. TRAFFIC CALMING DEVICES

Traffic Calming Devices (TCDs) are physical measures in street design that cue drivers to slow down. The effectiveness of TCDs does not depend upon a driver's compliance with traffic signs and signals, or police enforcement, though they may be used effectively in conjunction with them. In coordinated combinations, TCDs reduce speeds, alert drivers to pedestrians, and reduce the severity of collisions.

Though most of the examples listed below are not specified in the **Project Identification and Priority List**, the following TCDs are generally recommended for consideration by the Town on a project-by-project basis:

- **Speed humps** - raised "bumps" placed across residential streets to control chronic speeding problems where other methods of slowing traffic have not been effective. They are designed to calm traffic in residential areas, particularly near parks and schools. Similar to a speed bump, the speed hump is wider and has a more sloping side taper. The physical impact on passing vehicles is less severe at slower speeds than at higher speeds. Speed humps reduce vehicular speeds between intersections.
- **Speed Tables** - flat-topped speed humps typically long enough for the entire wheelbase of a passenger car to rest on the flat section. They often constructed with brick or other textured materials on the flat section.
- **Raised crosswalks** - Speed Tables outfitted with crosswalk markings and signage. By raising the level of the crossing, pedestrians are more visible to approaching motorists. Raised crosswalks can be appropriate for midblock pedestrian crossings where vehicle speeds are excessive.
- **Raised intersections** - raised flat areas that cover an entire intersection, with ramps on all approaches. By modifying the level of the intersection, the crosswalks are more readily perceived by motorists to be "pedestrian territory". Raised intersections should be used only where there is substantial pedestrian activity where other traffic calming measures have not been effective. Textured paving should be incorporated into the edges in order to provide visual and tactile cues.
- **Textured pavements** - stamped pavement or alternate paving materials to create an uneven surface for vehicles and pedestrians to traverse. Textured street pavement provides a visual and tactile cue for both drivers that they are driving in an area of high pedestrian use. Similarly, they cue pedestrians that they are entering a vehicular zone, and are a particularly effective treatment to warn visually impaired pedestrians. Textured street pavements should be used in areas of substantial pedestrian activity and where noise is not a major concern.
- **Neckdowns** – intersections with curbs that are extended to the edge of the vehicular travel lanes, reducing total roadway width from curb to curb. Curb

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Extensions slow vehicles by alerting drivers to potential pedestrians, visually tightening the vehicular path, and physically reduces turning radii. Curb Extensions also increase safety for pedestrians by shortening the road crossing distance.

- **Chokers** - curb extensions at midblock locations, usually combined with a crosswalk. Also known as “pinch points”.
- **Medians** – an island located along the centerline of a street that may or may not narrow the vehicular travel lanes at that location. Medians can be combined with crosswalks to provide pedestrians a temporary “refuge” as they cross the street. They are often landscaped to provide a visual amenity. Placed at the entrance to a neighborhood, and often combined with textured pavement, and called "gateway islands." Medians may be raised or partially sunken and combined with hydrophilic landscaping and drainage infrastructure to treat and drain storm water.

Other strategies that do not rely on pavement and curb manipulation can also be employed to cue drivers to the presence of pedestrians and induce slower vehicular speeds. Among them is on-street parking.

7. ON-STREET PARKING

Through a variety of means, on street parking benefits both pedestrians and drivers, and can contribute to the economic viability of a street.

- On-street parking provides a comforting physical buffer between pedestrians on sidewalks and moving traffic in the streets. Pedestrians feel safer with such a barrier that still allows them to clearly see into the street and drivers to clearly see pedestrians.
- On-street parking compliments pedestrian-friendly setbacks for on street commercial development. Commercial establishments with on street parking require fewer parking spaces in large expanse pedestrian-unfriendly parking lots. When commercial buildings are set back behind parking lots, longer walking trips through vehicular areas are necessitated for pedestrians coming from the street. This arrangement discourages pedestrian usage of the area.
- On-street parking calms traffic. Drivers tend to slow down when they sense potential conflict with opening car doors or vehicles suddenly moving into the traffic lane.
- On-street parking can be easily monitored and controlled in order to maximize short-term visitor usage.
- On-street parking can even provide a source of revenue that helps pay for parking enforcement and other transportation improvements.

Despite the potential for on-street collisions, such collisions more commonly occur in interior parking lots.

On-street parking alignment options include: parallel, diagonal or angle, and perpendicular.

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- 1.) **Parallel parking** is preferred. Parallel parking permits drivers a clear view of oncoming traffic. And it requires the least amount of additional right-of-way depth to accommodate parked cars.
- 2.) **Diagonal or angle parking.** Though diagonal parking provides the advantage of greater ease in maneuvering into a space with fewer steps than parallel parking, it is the most accident-prone on-street parking arrangement commonly used, providing the most potential conflicts between vehicles and pedestrians. Diagonal parking is the least efficient use of space per car and is exceptionally unsafe of bicyclists. Diagonal parking can be either “back-out” or back-in”.
 - a. **Back-out diagonal parking** requires a person leaving a parking space to back out into traffic, often without a good view of approaching cars or pedestrians.
 - b. **Back-in diagonal parking** requires additional maneuvering skill but provides some advantages over back-out diagonal parking:
 - i. Children are directed to the sidewalk and shielded by the door.
 - ii. Easier to unload and load trunk at the sidewalk.
 - iii. Sight visibility is improved for drivers and cyclists.
- 3.) **Perpendicular parking** has many of the disadvantages of angled parking but requires the even more depth in right-of-way.

For further information about parking management, see:

<http://www.seql.org/actionplan.cfm?PlanID=13>

8. LIGHTING

Location

Lighting for sidewalks and off-street paths should be provided where considerable pedestrian traffic is expected at night, where there is insufficient available light from the surrounding area, and at all designated road crossings.

Type

Each lighting situation is unique and must be considered on a case-by-case basis. Average maintained horizontal illumination levels of 5 lux (0.5 foot candles) to 22 lux (2 foot candles) should be considered, though higher levels are advisable in special areas where security problems might exist. Light poles should generally be 12 to 15 ft. high. Luminaries and poles should be at a scale appropriate for pedestrian use.

Style

Light fixtures, as well as other on-street facilities, like street furniture, can add a great deal in terms of street aesthetics and reinforce community identity. The Plan recommends the community adopt a particular style of street lighting fixture appropriate for the Town’s identity and coordinate this choice with stylistic choices in other street facilities.

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9. STREET FURNITURE

Well-designed walking environments are enhanced by street furniture, such as outdoor seating, lighting fixtures, bus shelters, trash receptacles, and water fountains. To select and properly site street furniture, careful attention should be given to the physical and social needs of the community and the various groups within it.

General design principles for selection, design, and siting of street furniture are listed below:

- Street furniture placement should never be placed so as to restrict regular pedestrian flow.
- Street furniture can be positioned to help reinforce a physical or visual buffer between pedestrians and vehicular traffic.
- Consider the role street furniture can take by providing familiar tactile landmarks, which can aid navigation for the visually impaired.
- Coordinate the style of various street elements to complement one another and reinforce a sense of common identity for the community.

Seating

- Seating should be located periodically along well-traveled paths and at destination points. For paths frequented by elderly citizens, adequate seating should be provided for along the path at a minimum of 150 ft.
- Provide seating in locations that are logical destinations or gathering points to allow opportunities for community interaction, particularly for students and the elderly.
- Seating should be oriented toward travel ways and areas of visual interest.
- Whenever possible in destination areas, provide moveable chairs.
- Seating should generally be located to take advantage of shade or in “suntraps” - areas that take advantage of winter sun and blocked from the wind.
- In addition to benches and other pre-manufactured seating, additional opportunities for seating may include other areas that meet the following parameters: smooth, level areas with a minimum depth of 14 inches, a minimum height of 12 inches, and a maximum height of 36 inches.

Trash receptacles

- Well placed, attractive, and properly maintained trash receptacles encourage pedestrian behavior toward keeping a cleaner community.
- Design style of trash receptacles should be carefully coordinated with other street furnishings to optimize aesthetic quality and opportunity for reinforcing community identity.

Bike racks

- Bike racks encourage pedestrian life by providing greater opportunity for people to leave their cars at home.
- Rack design should be attractive to encourage use by cyclist and property owners.
- Racks must allow the bike frame and wheel(s) to be locked securely.
- Racks should be built from heavy duty, weather & tamper resistant materials.
- Racks must support the bicycle frame and not hold the wheel.

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- Most racks are misused to some degree. Look for racks that provide the same opportunity for security whether the bike is on the end or middle of the rack.
- Locate racks next to entrance doors and in line of site of a window.

Raised Planters

- Planters can provide opportunities in addition to planting strips for street landscaping.
- Raised planters should be located either to act as buffers between pedestrian and vehicular ways, or to help define or enhance a public gathering space. Planters should not be located in the travel path or where they will otherwise obstruct normal pedestrian flow.
- Raised planters should be designed to provide additional opportunities for comfortable seating (meeting the dimensions specified in the **Seating** section).

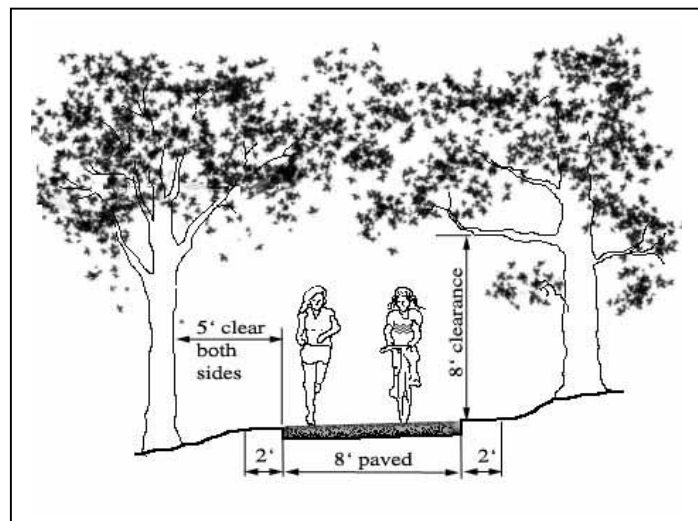
Water features

- Decorative Fountains usually provide an inviting visual and audible focal point for a public space. They are usually the dominant feature in any space.
- Fountains should be designed with audible effects in mind, so as to create an atmosphere conducive to conversation. Splashing water provides an element of privacy in public areas as it masks conversational tones.
- Raised fountains can provide highly favorable additional seating area.
- Fountains should be designed to permit free access to water by pedestrians.
- Great care should be given in planning fountain projects. Insure that there is an ongoing funding source for adequate fountain maintenance, as well as sufficient liability protection.

10. OFF-ROAD PATHS/TRAILS

Trail types

- 1.) **Proposed Urban Paths** – Pavement types may vary between conventional or pervious concrete, asphalt or crusher fines. Width of pavement should be maintained at 8 ft., with 2 ft. improved shoulders. Deviations for very short distances are acceptable when existing conditions do not physically permit standard trail width. Paved surfaces of all trail segments must be at least 6 ft. in width to allow accessibility for maintenance

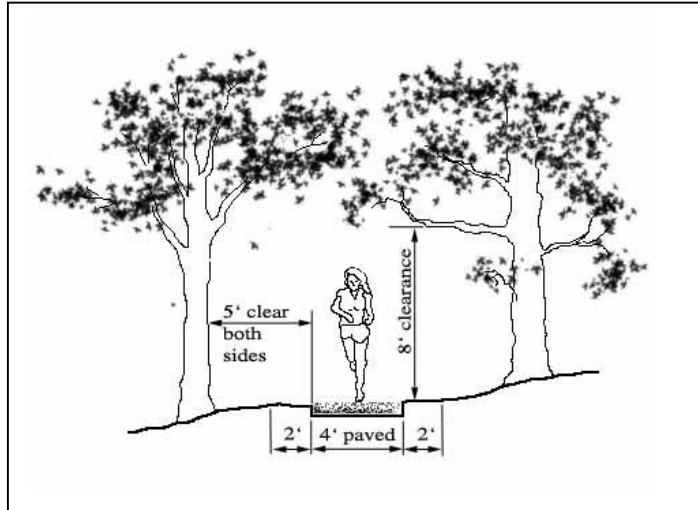


Urban path

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equipment (ATV type). Maximum slope shall not exceed 8%. Maintain a vertical clearance minimum of 10 feet.

- 2.) **Proposed Footpaths** – In environmentally sensitive areas, such as stream banks and lowlands, a 4 ft. wide soft surface should be used (crusher fines recommended), with 2 ft. improved shoulders. Maintain a vertical clearance minimum of 8 ft. All trails should be maintained with a 5 ft. cleared area from the edge of the trail on each side. Pitch trails to drain with a 2% minimum grade. Paving materials may vary in specific locations.



Foot Path

Paving

Each trail is unique in terms of its location, design, environment, and intended use. For each segment of the trail, care should be given to selecting the most appropriate pavement type, considering cost-effectiveness, environmental benefit, and aesthetics. Pavement options include:

- **Conventional Concrete** – Costly installation and maintenance, but requires less periodic maintenance than asphalt or crusher fines. Install 4-inch thickness on compacted 4-inch aggregate base course.
- **Pervious Concrete** – Allows storm water to percolate when used over permeable soils, superior traction, unfavorable to rollerblading and skateboarding, higher installation cost. Install according to manufacturer's specifications.
- **Asphalt** – smooth, joint free and softer than concrete, preferred by runners, rollerbladers, cyclists, handicap users, and parents pushing baby buggies, construction is quicker and costs significantly less than a concrete. Install a minimum 2-inch I-2 asphalt thickness with 4-inch aggregate base course. Pavement can last up to 20 years with periodic maintenance. Repair is quick and inexpensive.

For further information, see:

<http://www.americantrails.org/resources/trailbuilding/betterAsphalt.html> &

<http://www.americantrails.org/resources/trailbuilding/AsphaltCO.html>

- **Crusher fines** – Excellent for running trails, as well as walking, mountain bike and equestrian use. Can be constructed to meet ADA requirements. Constructed of small, irregular and angular particles of rock, crushed into an interlocking tight matrix. Typically costs about 1/3 the price of concrete paths, installed. For detailed information, see:

<http://www.americantrails.org/resources/trailbuilding/BuildCrushFinesOne.html>

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- **Dirt** – Recommended for mountain bikes and equestrian uses.
- **Boardwalk** – very expensive, for environmentally sensitive areas and wetlands.

For comparative costs of pavement types, see **Sample Cost Estimates for Facilities**.

Environmental Concerns

Trail corridors serve the community by protecting and enhancing the natural environment. Trails provide more transportation choices for people who wish to walk or bicycle. By doing so, they help to decrease dependence upon automobiles and thus contribute to improved air quality. Trails also improve water quality by establishing buffers along creeks and streams. These buffers provide habitat for a diversity of plant and animal species. They serve as natural filters, trapping pollutants from urban runoff, eroding areas and agricultural lands. Stream buffers also reduce the severity of flooding by releasing storm water more gradually, giving the water time to evaporate, or percolate into the ground and recharge aquifers, or be absorbed and transpired by plants.

All proposed trails and other improvements should be designed, constructed and maintained with their ecological value in mind. Any disturbance of natural features should be kept to a minimum and conform to all jurisdictional environmental policy and ordinances.

Grade and sight lines

Trails should be designed with a minimum slope to insure proper drainage and prevent pooling. The maximum slope should not exceed 8% on primary paths to prevent undue erosion of the trail, accessibility, safety and ease of use.

Horizontal and vertical curves should be gentle in order to permit ADA accessibility, the safe use of bicycles on the path, and to allow maximum sight distances for the safety and security of all trail users. Sight lines along the trail should be maintained at a minimum of 100 ft. wherever feasible.

Accessibility

The trail system should be designed to accommodate all people, regardless of age and ability. Off-road trails should meet ADA accessibility requirements whenever possible in the design.

See: <http://www.ncaonline.org/monographs/1trail-surfaces.shtml>

Multi-use

Off-road trails should accommodate a wide range of activities including exercise, family outings, shopping expeditions, or as a means to get to school or work.

Acquisition & Ownership

Acquisition negotiations of the proposed off-road trail corridors can result in various types of agreements with current landowners. The owner of the property need not be the same entity that operates and maintains the trail corridor if appropriate agreements are drawn. Ownership options to consider for individual trails include:

1. **Local government** – An existing department within the Town government (usually a department of parks and recreation) is assigned to manage and maintain the corridor.

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2. **Non-profit association** – A non-profit association or council may assume ownership of the corridor or control of the trail property. Local organizations that are experienced in trail management have distinct advantages in managing the trail system and responding to public needs. Local land trusts or trail conservancies may also be formed to take ownership of the trails.
3. **Private landowners** – May open their land to trail use by formal or informal agreement, and may sell or donate conservation easements while retaining other rights to the land.

Several legal instruments that may be used to transfer ownership or interests in property, either temporarily or permanently:

1. **Titles** – transfer permanent ownership of the land, usually acquired in “fee-simple” through contribution or outright sale.
2. **Easements** – permanently or temporarily convey ownership and control of a certain interest, right or tangible element of the property to a second property while the other retains other rights to the land. Conservation easements are often particularly appropriate to retain off-road trail ways, as these lands are often valuable for lowland or wildlife corridor protection.
3. **Access and Use Agreements** – specify how a portion of property may be used for a specified time. The agreement should contain a termination clause, obligations of the Town or trail manager, and a list of impermissible activities.
4. **Leases** – convey almost all rights, control and liability of the property to the lessee for a specified number of years (usually 25 or 99) and may provide the landowner with compensation from the lease.

Acquisition of land for trail corridors, on land that is currently underdeveloped, can take place as part of the Town’s subdivision process. As large parcels are subdivided, corridors that are specified in the adopted Pedestrian Plan are acquired from the developer and incorporated in to the Town’s trail system through whichever legal instruments are specified in the Town’s Subdivision Ordinance. The Town may choose to require through the ordinance that the developer contribute a fee for the construction of the trail improvements, as well as continual maintenance fees for its upkeep through a portion of homeowners’ association fees.

Liability

The following risk management strategy steps should be taken as the trail is planned and developed:

1. Identify potential hazards in the proposed trail alignment.
2. Develop a list of permitted trail uses along with the risks associated with each.
3. Identify applicable laws.
4. Design and construct the trail in accordance with recognized guidelines.
5. Develop a plan for handling medical emergencies.
6. Conduct regular inspections once the trail is open for use (see **Routine maintenance**).
7. Document inspection findings and actions taken.

For detailed information concerning liability, see:

<http://www.americantrails.org/resources/adjacent/RailLiability.pdf>

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Security & Safety

- Safety concerns, such as minimizing accidents and exposure to risk should be addressed during the design process of any off-road trails.
- Safety design elements to consider include:
 1. Lighting and emergency phones,
 2. Elimination of obstructions
 3. Clear sight lines by selective vegetation removal
 4. Planting prickly shrubs at select locations
- In addition to standard police patrol, Adopt-A-Trail programs should be considered that encourage local residents to police trails much like Neighborhood Watch.
- Trails are typically accessible during daylight hours only, and violations after dark are viewed as trespassing.
- Emergency access points for Police, Fire, and EMS should be signed and have restricted-access bollards that allow emergency vehicles into the site while prohibiting access by unauthorized vehicles. Most maintenance access points also suffice as emergency access points.
- When extreme weather is expected, efforts should be taken to close trail to protect the safety of the public.

“Front yard” v. “backyard” paths

Although off-road trails will typically follow stream banks and utility corridors, they should be designed as “front yard elements” whenever possible, connecting to existing sidewalks, as well as civic, residential and commercial destinations. This arrangement will maximize the transportation value of the trail, and also increase visibility and safety for users.

Access Points & Linkages to private property

Access opportunities to off-road trails should be maximized. The trail system should readily accessible from sidewalks in the public right-of-way. Commercial and institutional establishments, as well as residential developments, are strongly encouraged to provide direct access to the trail from their property at points convenient to potential users.

Maintenance & Operations

Facility inspections are an essential part of maintaining any facility. Planning and design of all off-road trails should include management plans that help gauge operational funds for various maintenance projects. Proper maintenance must address both the performance condition of the trail preserving the environmental integrity and character of any environmental areas that are adjacent to the trail. Maintenance and repair projects can be managed either through annual service contracts put out to bid, or become an integral part of the Facilities Management maintenance program. Annual budgets for trail maintenance and operations should document maintenance items, facility improvements, and other related costs to ensure the long-term health of trail facilities, the environment, and safety for users.

Three tiers of maintenance programs should be included in the management plan:

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1. **Long-term maintenance programs** - includes renovation of facilities and trail resurfacing. Comprehensive inspections should occur twice a year to record user impacts, general wear and tear, and other factors that may affect safety, environmental features, or structural integrity of the facility. If long-term maintenance programs are deferred, the safety of the trail is compromised and costly capital improvement funds to renovate damaged areas will be required. Typical long-term maintenance activities include:
 - Annual vegetation clearance (June and September)
 - Annual inspection by engineer to identify potential repairs needed for bridges and structures, drainage structures, pavement, railings, and fences
 - Revegetation during planting seasons
2. **Routine maintenance** – includes safety and repair issues that occur throughout the life of the facility. Frequency of routine maintenance should take place on a monthly basis, dependent upon the amount of usage and availability of funds. Typical routine maintenance activities include:
 - Removal of litter and general cleaning
 - Sweeping and leaf removal
 - Mowing and weed control
 - Pruning and removal of encroaching/fallen branches
 - Trail edging
 - Route signage maintenance
 - Graffiti control
 - Regular presence of volunteers to report faults
3. **Emergency repairs** - necessitated when storm damage makes the trail unsafe for daily use. Severe weather may occasionally cause damage to the facility either through wind, erosion, or fallen trees. Emergency repair funds for severe weather should be allocated and allowed to rollover from year to year for this inevitability.

Volunteer programs for greenway maintenance can be organized through the “Adopt-A-Park” program or could be coordinated with the existing greenway volunteer programs. Volunteer labor can yield a substantial savings for labor costs on routine maintenance and repair. Materials can be donated by a group, provided through a corporate sponsor, or purchased by the Town.

Additional Accessibility Information

The following accessibility standards and guidelines are provided by the **Pedestrian and Bicycle Information Center** (www.walkinginfo.org)

A Checklist for Accessible Sidewalks and Street Crossings

The Americans with Disabilities Act (ADA) requires that new and altered facilities be accessible. Title II of the ADA covers sidewalk and street construction and transit accessibility, referencing the ADA Accessibility Guidelines (ADAAG) or the Uniform Federal Accessibility Standards (UFAS) for new construction and alterations undertaken by or on behalf of a state or local government. The

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Department of Justice (DOJ) title II regulation specifically requires that curb ramps be provided when sidewalks or streets are newly constructed or altered. (Requirements for existing pedestrian networks not otherwise being altered are also included in the DOJ regulation, available on line at www.ada.gov/reg2.html). The ADA Accessibility Guidelines (www.access-board.gov/adaag/html/adaag.htm) include standards for site development applicable to new construction and alterations in the public right-of-way.

CURB RAMPS

A curb ramp or other sloped area is required wherever a new or altered pedestrian walkway crosses a curb or other barrier to a street, road, or highway. Similarly, a curb ramp is required wherever a new or altered street intersects a pedestrian walkway. A curb ramp may be perpendicular to the curb it cuts or parallel with the sidewalk. Other designs may also comply, including sidewalks that ramp down to a lesser curb height, with a short perpendicular curb ramp to the street; blended or at-grade connections, or raised crossings that connect at sidewalk level.

The running slope of a new curb ramp should not exceed 1 in 12 (8.33%). Steeper ramps are not usable by many pedestrians in wheelchairs and scooters. Cross slope should be limited to 2%.

A level landing should be provided at the top of a perpendicular curb ramp. A curb ramp must connect at the top to a level landing that is at least 48 inches deep with a cross slope of no more than 2%. The side flares of a curb ramp are not intended for accessible travel (the slope of a side flare is limited so that it will not present a tripping hazard to pedestrians).

The foot of a curb ramp should be contained within the crosswalk markings. Pedestrians who use wheelchairs should not be directed outside the crosswalk or into an active travel lane in order to cross stopped traffic. If a diagonal ramp is used, a 48-inch long bottom landing must be provided in the space between the curb radius and curb line extensions.

The transition from curb ramp to gutter should be flush. Lips are not permitted. Gutter counter slope in the line of travel should not exceed 1 in 20 (5%) and should connect smoothly with other elements of the pedestrian network.

The boundary between the sidewalk and street should be detectable underfoot. A 24-inch strip of truncated dome or other approved detectable warning material should be provided the full width of the ramp or other uncurbed connection to the crosswalk so that pedestrians do not inadvertently travel into the street.

SIDEWALKS

A new sidewalk should be wider than the minimum accessible travel width of 36 inches. Additional maneuvering space is necessary for a pedestrian using a wheelchair to turn, to pass by other pedestrians, to operate and pass through an entrance door, to use sidewalk telephone or to activate a pedestrian crossing button. A 60-inch minimum width can accommodate turns and passing space and is recommended for sidewalks adjacent to curbs in order to provide travel width away from the drop-off at street edge; a 48-inch width can accommodate side-by-side travel with a service animal.

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The cross slope of a sidewalk should not exceed 2%. Excessive cross slope requires additional energy to counteract and tends to direct wheelchair users into the street, particularly when it is wet, icy, or snowy underfoot. At driveways there should be a minimum 36-inch (915 mm) wide passage with a cross slope of no more than 1:48 (2%). Corners at intersections should comply in both directions, since the running slope of one walkway will be the cross slope of another.

Street furniture, plantings, and other fixed items should not protrude into travel routes. Pedestrians with vision impairments can detect objects mounted on walls or posts if they are installed so that the leading edge is less than 27 inches above the sidewalk. Items mounted above this height should not project more than 4 inches into any circulation route. Particular care should be taken to locate temporary signage so that it does not impede pedestrian travel.

STREET CROSSINGS

Consider the information needs of blind and low-vision pedestrians at intersections.

When pedestrian signals are provided, their crossing and timing information should be available to all users. The audible and tactile information delivered at the pedestrian button of an accessible pedestrian signal (APS) can identify pedestrian signal phases and provide other non-visual information about the nature of a crossing.

Insufficient crossing time may be a barrier for some pedestrians. Every pedestrian cohort should be expected to contain some walkers whose rate of travel is less than 3.5 feet per second. Some jurisdictions add additional time using video technology; others employ a pedestrian button to call for a longer crossing cycle.

TEMPORARY WORK

Temporary work should be accessible. Where construction blocks a public sidewalk for more than a short time, an alternate accessible route should be provided that is cane-detectable. Sidewalk barriers should be continuous and cane-detectable as well. Temporary events and facilities should also meet accessibility criteria.

OTHER PEDESTRIAN FEATURES

Pedestrian facilities on and along sidewalks must be accessible. Signal actuating buttons, drinking fountains, telephones, kiosks, and other pedestrian elements should meet accessibility criteria for approach and maneuvering space, reach range, and operation.

Additional rights-of-way guidelines may be found at the U.S. Access Board's website at www.access-board.gov. The Board also maintains a toll-free technical assistance line at 800/872-2253 (V); 800/993-2822 (TTY).

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Information Sources:

Planning and Designing Local Pedestrian Facilities – NCDOT, Office of Bicycle and Pedestrian Transportation, February 1997

North Carolina Bicycles Facilities Planning and Design Guidelines – NCDOT, Office of Bicycle and Pedestrian Transportation, January 1994

James City County Greenway Master Plan June 25, 2002
Greenway Maintenance and Management, www.jccgov.com

American Trails – Resources & Library
<http://www.americantrails.org/resources/index.html>

Creating Connections

The Pennsylvania Greenways and Trails How-to Manual – Russ Johnson, Pennsylvania Environmental Council, Pennsylvania Greenways Partnership, 1998
<http://www.pagreenways.org/toolbox/creatingconnections.pdf>

Rail-Trails and Liability

A Primer on Trail-Related Liability Issues & Risk Management Techniques – Hugh Morris, Rails-to-Trails Conservancy in cooperation with the National Parks Service Rivers, Trails and Conservation Assistance Program, September 2000
<http://www.americantrails.org/resources/adjacent/RailLiability.pdf>

Cary Parks, Recreation and Cultural Resources Facilities Master Plan
<http://www.townofcary.org/depts/prdept/greenwayreco.pdf>

Walkinginfo.org

Trafficcalming.org

Sustainable Environment for Quality of Life - SEQL.org

The Social Life of Small Urban Spaces – Whyte, William H., 1980

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Some Benefits of Greenways

From the Great Rivers Greenway District in St. Louis

Greenways improve everyday living.

An interconnected system encourages neighborhood and community lifestyles that emphasize outdoor recreation and promote walking and bicycling to school, work and shopping. By linking the system to streets, sidewalks and other public spaces, it helps communities and neighborhoods to function in a more connected, healthy and enjoyable way.

Greenways Link a Community's Resources.

By providing physical connections and green "buffers," a system of greenways, parks and trails helps unite spaces within a community. Residential and commercial districts, educational campuses, civic and cultural amenities, and light industry all can be interwoven with a well-designed open space plan that incorporates and respects the natural environment.

Greenways Create a Stronger Tax Base.

Neighborhoods and communities thrive when public investment is made in greenways, parks and trails, encouraging additional public and private investment in the area. The enhancement of "green infrastructure" is an important aspect of redevelopment and contributes to increased property values and, thus, tax revenue. Neighborhoods and communities prosper, job opportunities increase and the region stabilizes financially. In established and growing communities, the additional open space provided by the interconnected system also increases.

Research from the National Park Service:

By conserving a greenway corridor rather than permitting intensive development, local agencies may reduce costs for public services such as sewers, roads, and school facilities. Establishing a greenway in an area prone to hazards, such as flooding, may decrease costs for potential damages. Greenways and associated vegetation can also help control water, air and noise pollution by natural means, resulting in potential decreased pollution control costs. Greenways and trails may promote physical fitness, leading to decreased public health care costs.

Greenway corridors provide a variety of amenities, such as attractive views, open space preservation, and convenient recreation opportunities. People value these amenities. This can be reflected in increased real property values and increased marketability for property located near open space. Developers also recognize these values and incorporate open space into planning, design, and marketing new and redeveloped properties.

Cases and examples: <http://www.nps.gov/pwro/rtca/propval.htm>

More information available at: <http://www.nps.gov/pwro/rtca/index.htm>

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From San Marco Greenbelt Alliance:

Several examples of development and tax revenue

<http://www.smgreenbelt.org/benefits.htm>

Trail users generate tax revenue and income for local businesses. A study conducted by the Maryland Department of Natural Resources found that although the Northern Central Rail-Trail cost \$191,893 to construct, it generated \$303,750 of State tax revenue during one year. (see <http://ntl.bts.gov/DOCS/430.html>) And the 1992 "Impacts of Rail-Trails" study by Roger L. Moore, et al. found that for the three trails studied, trail users of each trail were responsible for generating over \$1.2 million for local businesses. "Users spent an average of \$9.21, \$11.02, and \$3.97 per person per day as a result of their trail visits to the Heritage, St. Marks, and Lafayette/Moraga Trails respectively." For more data on outdoor recreation spending, "Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors" at the National Forest Service site: <http://www.nps.gov/pwro/rtca/econindx.htm>

From Florida Greenways, "What is a greenway? Economic Prosperity"

Property near but not on the Burke-Gilman Trail in Seattle sold at an average of 6.5 percent more than similar property elsewhere. Property values directly adjacent to the trail were not affected, either in average price or ease of sale. Approximately 60 percent of the owners of homes and condominiums adjacent to the trail believed either their homes sell for more because of the trail or would not be effected. It was also found that homes and condominiums near the trail are easier to sell because of their proximity to the trail (Source: Evaluation of the Burke-Gilman Trail's Effect on Property Values and Crime, by the Seattle Engineering and Department Office of Planning, 1987).

<http://www.geoplan.ufl.edu/projects/greenways/whatisagreenway.html#economicprosperity>

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How to Build a Sidewalk

A STEP-BY-STEP GUIDE FOR BUILDING PEDESTRIAN IMPROVEMENTS

I. PROJECT REQUEST

All requests for new sidewalks (or other pedestrian facilities) should be directed to the Pedestrian Needs Committee (PNC). A request may come from sources such as:

1. A Pedestrian Plan evaluation exercise (see the **Plan Evaluation** section)
2. An unsolicited request from an individual or group
3. Observations of PNC members themselves, elected officials, Town Administrator, Public Works Director or other Town staff members.
4. Other

II. PROJECT EVALUATION PHASE

The PNC should evaluate the project with respect to the following criteria:

1. Appropriateness of the project with respect to the Pedestrian Plan

- a. Does the project meet the goals of the Pedestrian Plan?
- b. Where does the project fall into the priorities of the Plan?
- c. Does the project meet current and anticipated needs and conditions?
- d. Can the requested project be altered in some way to meet the above criteria?

2. Ownership of the land

Does the Town already own the right-of-way? If not, the PNC should determine and recommend the most appropriate course of action:

- a. Purchase the property required by fee simple.
- b. Acquire an easement on the property.
- c. Condemn the portion of the property needed.
- d. Find an alternate project to meet the goal.

3. Source and availability of proper funding

The PNC should determine and recommend the most appropriate funding strategy for the project. The PNC may wish to consider:

- a. Powell Bill Funds
- b. Applicable grants
- c. Other sources (See **Funding Opportunities**).

III. PROJECT DESIGN/CONSTRUCTION PHASE

If the project meets the intent of the Pedestrian Plan, and it has been determined that the property required for the project can be obtained, the PNC should then examine the project in terms of the four specific parameters listed below. Each of these parameters will determine some aspect of how the project construction process will play out.

1. Project Area

Larger projects require additional state permitting. If the project involves one acre or more of disturbed earth, a plan must be submitted to the North Carolina

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Department of Natural Resources (NCDENR) for a 30-day review of the project. The process for submitting projects to NCDENR, as well as the application forms required, can be found at their Division of Land Resources webpage: <http://www.dlr.enr.state.nc.us/pages/sedimentforms.html>

Additional permits may be required for particular projects depending upon the site involved. For more information, contact the local NCDENR office at 704-663-1699.

2. Project Cost

A rough estimate of the overall project cost should be performed at the outset to determine if the project must be bid publicly.

Project cost <\$300,000

Project does not require public bidding, however obtaining multiple bids, informally, is recommended to find the most competitive price for project construction.

Project cost >\$300,000

- Public bid for the project is required according to General Statute.
- Requires Town Planning Board Approval
- Bid projects using a professional list serve. Advertising in newspapers may serve this purpose, but are usually not as cost-effective.

3. Project Property Owners

Owners of properties directly affected by the project must always be contacted, but depending upon the project size as well as its civic importance, this can occur privately or may require a public workshop.

4. Project Design

Some projects are small enough and/or do not require exact measurements for construction; short trail sections, for instance. These may be field determined and built according to a standard specification (see **Facility Standards & Guidelines**). But projects that tie into existing streets or other facilities more often require careful coordination and measured plans. An attempt to save money at the front end by skipping the requirement for construction plans can likely produce a project that is unsatisfactory, problematic, and reap unexpected expense.

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Additional References

Listed below are some additional specific references to existing documents that may aid implementation of the Plan.

Sustainable Environments for Quality of Life (SEQL) is a regional initiative in the rapidly growing 15-county Charlotte, NC /Rock Hill, SC area. SEQL supports the region's efforts to develop integrated and sustainable long-range plans to ensure robust economic development, a clean and healthy environment, and a positive quality of life for its future. SEQL is funded in part by a grant from the EPA to Centralina Council of Governments in cooperation with Catawba Regional Council of Governments. Initiatives include the development of an action notebook for local jurisdiction elected officials and planners to use as a guide to development of policies and actions on the local level. Outreach extends to chambers, environmental groups and citizens. See more at www.seql.org
Pedestrian-related Action Items include:

- Pedestrian Friendly Streetscapes
<http://www.seql.org/actionplan.cfm?PlanID=16>
- Connectivity for Multi-Modal Transit
<http://www.seql.org/actionplan.cfm?PlanID=4>
- Greenways and Open Space
<http://www.seql.org/actionplan.cfm?PlanID=3>

Active Living by Design is a national program of The Robert Wood Johnson Foundation and is a part of the UNC School of Public Health in Chapel Hill, North Carolina. The program will establish and evaluate innovative approaches to increase physical activity through community design, public policies and communications strategies. For more information, visit www.activelivingbydesign.org or call: 919-843-2523.
For trail-related information, see: <http://www.activelivingbydesign.org/index.php?id=29>